

# 1. INTRODUCTION

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## LOCATION AND HAZARD RISK

Louisiana is located on the coast of the hurricane-prone Gulf of Mexico, as well as at the mouth of the Mississippi River watershed—which drains over 40% of the continental United States. The natural forces that cause coastal storms and flooding are inevitable. Moreover, such threats are compounded by the state’s historic reliance on engineered flood-protection measures such as levees and floodwalls, in addition to elaborate systems of canals, pipes, and pumps (i.e., forced drainage systems). But these measures provide a thin defense against flood hazards and create a false sense of security. When they fail, the results can be catastrophic. In particular, the combination of failed engineered flood-protection measures and the constant presence of human-influenced and natural hazards have made flood events more common and the impacts more severe in Louisiana. For various reasons, parts of southern Louisiana are subsiding at rates fast enough to be observed within decades or even years; coastal wetlands are eroding due to the combined effects of subsidence, severe weather, lack of new alluvial sediments, and saltwater intrusion via navigation and oil and gas industry channels; and climate change is causing warmer oceans and rising sea levels, which is likely to produce more frequent extreme weather events and compound coastal land loss. These circumstances are narrowing the natural buffers between the Gulf of Mexico and Louisiana’s population centers, reducing protection from high wind and storm surges (which are the highest natural hazard risks to the state), and augmenting already significant risks to the state.

As suggested above, Louisiana is not only particularly prone to certain natural and human-influenced hazards, but it is also more vulnerable because measures taken to protect against certain hazards (i.e., engineered flood-protection measures) have compounded the threats posed by nature. Similarly, other human actions involving natural resource extraction in Louisiana have also contributed to the state’s susceptibility to hazards.

In light of these challenges, Louisiana has been learning from its experiences with hazards to reduce the impacts of future hazard events. In 2004, the state embarked on a comprehensive program to markedly improve its hazard mitigation efforts, resulting in the State of Louisiana Hazard Mitigation Strategy document (completed in 2005). Following the 2005 hurricane season, Louisiana began updating its State Hazard Mitigation Plan (completed in 2008). A required Plan Update, as per the Code of Federal Regulations (CFR), was approved in 2011. This present Plan Update follows in that vein, but with a number of notable changes.

## HAZARD MITIGATION

To fully understand Louisiana’s hazard mitigation efforts, it is first critical to understand how hazard mitigation relates to the broader concept of emergency management. In the early 1980s, the newly-created Federal Emergency Management Agency (FEMA) was charged with developing a structure for how the federal, state, and local governments would respond to disasters. FEMA developed the *four phases of emergency management*, an approach which can be applied to all disasters. The four phases are as follows:

- **Hazard mitigation**—described by FEMA and the Disaster Mitigation Act of 2000 (DMA 2000) as “any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.” The goal of mitigation is to save lives and reduce property damage. Besides significantly aiding in the obviously desirous goal of saving human lives, mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities and minimize community disruption, helping communities return to usual daily living in the aftermath of disaster. Examples of mitigation involve a range of activities and actions including the following: land-use planning, adoption and enforcement of building codes, and construction projects (e.g., floodproofing homes through elevation, or acquisition or relocation away from floodplains).
- **Emergency preparedness**—includes plans and preparations made to save lives and property and to facilitate response operations in advance of a disaster event.
- **Disaster response**—includes actions taken to provide emergency assistance, save lives, minimize property damage, and speed recovery immediately following a disaster.
- **Disaster recovery**—includes actions taken to return to a normal or improved operating condition following a disaster.

Figure 1.1 illustrates the basic relationship between these phases of emergency management. While hazard mitigation may occur both before and after a disaster event, it is significantly more effective when implemented before an event occurs. This is one of the key elements of this Plan and its overall strategy: reduce risk before disaster strikes in order to minimize the need for post-disaster response and recovery.

As Figure 1.1 demonstrates, mitigation relies on updating in the wake of disaster. This can give the appearance that mitigation is only reactive rather than proactive. In reality, however, post-disaster revision is a vital component of improving mitigation. Each hazardous event affords an opportunity to reduce the consequences of future occurrences.



**Figure 1.1. The four phases of emergency management and their relation to future hazard mitigation (source: FEMA).**

Unfortunately, this cycle can be painful for a community. For instance, the risks of disasters that could create catastrophic incidents in Louisiana were thought to be relatively well-understood prior to 2005. However, the impact of the 2005 hurricane season on the Gulf Coast region of the United States prompted a new level of planning and engagement related to disaster response, recovery, and hazard mitigation. Hurricanes Katrina and Rita hit three weeks apart and together caused astonishing damage to human life and to property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history. The 2005 hurricane season confirmed Louisiana’s extreme exposure to natural disasters and both the positive effects and the concerns resulting from engineered flood-protection solutions.

Katrina and Rita had profound impacts on emergency management and hazard mitigation in Louisiana. As detailed later in this document, significant funding has been made available to the State of Louisiana for the purpose of hazard mitigation planning. The storms also raised awareness of the importance of hazard mitigation among decision-makers and the general

population, which has been particularly important since natural hazards will likely be increasing in frequency, magnitude, and impact in the coming years due to climate change.

## GENERAL STRATEGY

The Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), with the assistance and cooperation of the State Hazard Mitigation Planning Committee (SHMPC), developed the comprehensive 2005 *State of Louisiana Hazard Mitigation Strategy*, documented in four volumes:

- I. *State of Louisiana Hazard Mitigation Plan*
- II. *State of Louisiana Hazard Mitigation Plan Appendix*
- III. *State of Louisiana Hazard Mitigation Program*
- IV. *State of Louisiana Administrative Guidelines and Procedures*

During the 2005 Plan Update process, Katrina and Rita made landfall in Louisiana, requiring that all staff and resources be committed to response efforts. Many of the recommendations in the 2005 Plan Update were not implemented due to the intensity of the response efforts. As part of the 2011 Plan Update, and as described in the 2008 Strategy, the State Hazard Mitigation Team (SHMT) began a long-term effort to better integrate key components of all plans with hazard mitigation implications in Louisiana to ensure that the programs, policies, recommendations, and implementation strategies are internally consistent. As each of these documents has been adopted by various agencies within the state, the SHMT has worked to incorporate this information into the decision process. As a result, the Strategy was broadened to include the following documents by reference:

- *State of Louisiana Emergency Operations Plan* (July 2009)
- *State of Louisiana GOHSEP Continuity of Operations Plan* (2009)
- Regional and community-based long-term recovery plans (various dates from 2005 through 2009)

The 2011 Plan Update maintained the organization of the 2005 and 2008 Plans, loosely paralleling the order of requirements listed in the CFR. It contained the following sections in this order:

- Section One Introduction
- Section Two Plan Adoption
- Section Three Planning Process
- Section Four Hazard Identification and Profiles
- Section Five Statewide Risk Assessment
- Section Six Risk Assessment for State-Owned Assets
- Section Seven Capability Assessment

- Section Eight Mitigation Action Plan
- Section Nine Coordination with Local Mitigation Planning
- Section Ten Plan Maintenance Process

Most of these sections were written in summary form with appendices related to each section that provided full, detailed discussions of methodologies and complete results.

While these updates have been necessary and beneficial, after three revisions the Plan (at nearly 1700 pages) had become too unwieldy for constructive use. At its first meeting in March 2013 the entire SHMPC decided to renovate the Plan to make it (1) more accessible to the general public and (2) more efficient for state and local governmental use (see Appendix A for details on the planning process). Consequently, this Plan Update now also coheres with the recent Plain Writing Act of 2010, which requires federal agencies to use clear communication that is accessible, consistent, understandable, and useful to the public. While the State of Louisiana is not required to meet such standards, the Act aligns with best practices in hazard mitigation. Since successful hazard mitigation relies on full implementation and cooperation at all levels of government and community, a successful hazard mitigation plan must also be easily used at all of these levels. Nevertheless, the SHMPC was not ignorant or dismissive of the successful analysis and mitigation planning executed in the previous Plan Updates. This Plan Update remains coherent with those documents, retaining language and content when needed, deleting it when appropriate, and augmenting it when constructive.

## THE 2014 PLAN UPDATE

Although the SHMPC has made drastic revision to the text, this 2014 Plan Update still proceeds with the five current goals of the state's hazard mitigation teams, which represent long-term commitments by the State of Louisiana. Four of those goals are from the 2011 Plan Update, while a fifth goal was added as an amendment in May 2013 as part of a programmatic agreement between the State Historic Preservation Office (SHPO), GOHSEP, and FEMA. The goals are as follows:

- Goal 1:** The State of Louisiana will improve education and outreach efforts regarding potential impacts of hazards and the identification of specific measures that can be taken to reduce their impact.
- Goal 2:** The State of Louisiana will improve data collection, use and sharing to reduce the impacts of hazards.
- Goal 3:** The State of Louisiana will improve capabilities and coordination at the municipal, parish, regional and state level to plan and implement hazard mitigation projects.

**Goal 4:** The State of Louisiana will continue to pursue opportunities to reduce impacts to the State’s manmade and natural environment through mitigation of repetitive and severe repetitive loss properties and other appropriate construction projects and related activities.

**Goal 5:** The State of Louisiana will improve on the protection of its Historic Structures/Buildings, Traditional Cultural Properties and Archaeological Sites from natural and human-constructed hazards.

This Plan Update makes a number of textual changes throughout. But the most obvious changes are data related and structural. First, the Spatial Hazard Events and Losses Database for the United States (SHELDUS) was used as a data source for hazard identification because it incorporates all storm event data from the National Climatic Data Center (NCDC) Storm Events Database used in previous plans, as well as storm event data from other sources including the NOAA Storm Prediction Center, National Hurricane Center, and U.S. Fire Administration. Furthermore, all of the sections were updated to reflect the most current information and the most current vision of the Plan Update. Second, instead of ten sections and twelve appendices, the present Plan Update has six sections and five appendices. The most significant changes are the newly developed hazard profiles and risk assessments, the removal of much repetition between sections from the previous Plan Updates, and the incorporation of a new section: the SHPO Risk Assessment. The 2014 Plan Update is organized generally as follows:

- Section One Introduction
- Section Two Hazard Identification and Statewide Risk Assessment
- Section Three State Historical Properties Risk Assessment
- Section Four Capability Assessment
- Section Five Mitigation Strategy
- Section Six Mitigation in Action
  
- Appendix A Planning Process
- Appendix B Plan Maintenance
- Appendix C Mapping Methodology
- Appendix D Plan Adoption
- Appendix E Endnotes

From the first plan, the Plan Adoption was moved from Section Two to an appendix. The Planning Process, previously comprising Section Three, was also moved to an appendix, and it was edited to explain better the process used to update the Plan.

The Hazard Identification and Profile was moved from Section Four to Section Three in the present Update. It was also synthesized with the Risk Assessments for statewide and state-owned assets for each hazard. Additionally, new hazards (Sinkholes, Saltwater Intrusion, and Sea Level Rise) were added, while other hazards were moved. Extreme Heat was profiled

separately from Winter Weather, and Extreme Cold and Snow were profiled under Winter Weather. Lightning, Hail, and High Wind were all profiled under Thunderstorms, and Tropical Cyclones (Hurricanes) and Tornadoes were profiled fully, as opposed to their previous profiling as only High Wind Tornado and High Wind Hurricane. Furthermore, Storm Surge was profiled as a subcategory of Tropical Cyclones.

The Statewide Risk Assessment (previously comprising Section Five) and the Risk Assessment for State-Owned Assets (previously comprising Section Six) were consolidated within Section Two of the present Update. In addition, this Update changes the methodology for composite ranking between parishes in the Statewide Risk Assessment (see the Mapping Methodology in Appendix D), as well as the methodology used in the Risk Assessment for State-Owned Assets to reflect current data on damage.

The Capability Assessment of the previous plan's Section Seven was moved to become Section Four of the present Update. The federal funding data was revised, and non-federal funding information was added. The Land Use section was expanded, and the surveys from the previous plan were omitted due to minimal response. Section Nine of the old plan (Coordination of Local Planning) also became a part of Section Four (Capability Assessment) of this Plan Update.

The Mitigation Action Plan that made up Section Eight of the old plan became Section Five in this Plan Update. It was revised to reflect the process used in this Plan Update, as well as the results from the SHMPC evaluation and ranking of hazards. New actions were added.

Lastly, Section Ten (Plan Maintenance) was moved to an appendix in this document.

Despite numerous changes in this Plan Update, the Plan remains consistent in its emphasis on the few types of hazards that pose the most risk to loss of life, injury, and property in the State of Louisiana. The extent of this risk is dictated primarily by geographic location. Most significantly, the entire state remains at high risk of water inundation from various sources, including storm surge caused by tropical storms and hurricanes; riverine and backwater flooding; and failure of levees, floodwalls, and forced drainage systems. All of Louisiana is also at high risk of damages from high winds and wind-borne debris—caused by various meteorological phenomena. Other hazards threaten the state, too, although not to such great degrees and not in such widespread ways. For instance, while hail and winter weather pose notable danger, they mainly threaten the northern parishes. Similarly, although all parishes may be affected by tropical storms and hurricanes, southern parishes are far more threatened by them than other parishes due to their proximity to the Gulf of Mexico. In all cases, the relative social vulnerability of areas threatened and affected plays a significant role in how governmental agencies prepare for and respond to disasters.

Mitigation efforts related to particular hazards are highly individualized by jurisdiction. Flexibility in response and planning is essential. Indeed, although funding for relief from major disasters has been available and ample, funds are not always directed effectively to the appropriate areas due to relatively poor communication between federal, state, and local

authorities. The most important step forward to improve hazard management capability is to improve coordination and information sharing between the various levels of government regarding hazards.

Based on interactions with local plan owners, GOHSEP has discovered that most local jurisdictions are not managing their plans on a routine basis, despite varying levels of ongoing mitigation activities. Moreover, in many cases, local jurisdictions do not know the point of contact for their plan. Consequently, GOHSEP has committed to support the updating of FEMA-approved, DMA 2000-compliant jurisdictional plans. Between October 2014 and December 2017, the 64 parish plans are due for updating and approval. Of these, three parishes have already secured pre-disaster mitigation (PDM) funding for their next plan. To prepare for the 61 other updates, GOHSEP has allocated funding from the Hurricane Isaac FEMA Hazard Mitigation Grant Program to support a three-year planning effort that will update plans in a framework that facilitates future updates and provides a degree of uniformity across jurisdictions. Thus, all plans will use similar, appropriate data sources and data processing steps. This coordination allows comparisons between parishes for the first time, which will foster more consistent mitigation planning within the state.